Minneapolis
City of Lakes

CPED STAFF REPORT

Prepared for the Heritage Preservation Commission
HPC Agenda Item #2
September 13, 2016
BZH-29307

HERITAGE PRESERVATION APPLICATION SUMMARY

Property Location:	1725 University Avenue SE
Project Name:	1725 University Avenue SE Roof
Prepared By:	Mei-Ling Smith, Senior City Planner, (612) 673-5342
Applicant:	Alpha Delta Phi
Project Contact:	Patrick Miller
Ward:	2
Neighborhood:	Prospect Park Association & Marcy-Holmes Neighborhood Association
Request:	To replace the existing slate roof with a synthetic slate roofing material.
Required Applications:	

Certificate of Appropriateness	To replace a historic slate roof with a synthetic slate roof in the U of M Greek Letter Chapter House Historic District

HISTORIC PROPERTY INFORMATION

Current Name	Alpha Delta Phi Fraternity
Historic Name	Alpha Delta Phi Fraternity
Historic Address	1725 University Avenue SE
Original Construction Date	1924
Original Architect	Edwin Hewitt, Hewitt & Prown
Original Builder	Madsen Construction Company
Original Engineer	Not applicable
Historic Use	Student housing - fraternity
Current Use	Student housing - fraternity
Proposed Use	Student housing - fraternity

Date Application Deemed Complete	August 18, 2016	**Date Extension Letter Sent**	Not applicable
End of 60-Day Decision Period	October 17, 2016	**End of 120-Day Decision Period**	Not applicable

CLASSIFICATION

Local Historic District	University of Minnesota Greek Letter Chapter House Historic District
Period of Significance	1907 - 1930
Criteria of Significance	Events, Architecture
Date of Local Designation	2003
Date of National Register Listing	Not applicable
Applicable Design Guidelines	*University of Minnesota Greek Letter Chapter House District Design Guidelines (2004)* *The Secretary of the Interior's Standards for Treatment of Historic Properties*

SUMMARY

BACKGROUND. The subject site is located at the intersection of 18th Avenue SE and University Avenue SE. The existing building is a contributing property in the University of Minnesota Greek Letter Chapter House Historic District.

The University of Minnesota Greek Letter Chapter House Historic District is significant for its properties' association with significant events or with periods that exemplify broad patterns of cultural, political, economic, and social activity (criterion #1) and for its properties which embody the distinctive characteristics of an architectural or engineering type or style or method of construction (criterion #4). The designation study notes that the chapter houses symbolize "the Greek letter society's impact on the University of Minnesota during a great period of expansion."[1] In addition, the properties on Fraternity Row constitute a largely uninterrupted, four-block streetscape that "provides a view of a distinctive type of 20th century residential architecture, and reflects the vigor of the 1920s building boom."[2]

The building was constructed as part "Fraternity Row" in 1924. English and other Period Revival designs were popular for chapter house construction during this time. The district's design guidelines state that the designated fraternity and sorority chapter houses, which were built between 1907 and 1936, are richly detailed in stone, with slate roofs and leaded glass, while others have stucco and brick exteriors. Stone, brick, slate, and iron were used "to convey a sense of history and tradition."[3] There are 19 chapter houses that are contributing to the historic district. This particular building is one of twelve houses in the district that is still occupied by its original chapter, Alpha Delta Phi Fraternity.

The existing building is a three-story English Revival Style building that is clad with tan brick and smooth limestone trim. The original building permit also references that reinforced concrete was used in its construction. The gable roof has a 12/12 pitch and several shed dormers. The roof is clad in gray slate, and stone-capped parapets terminate each gable end. According to the City's permit records, there were various modifications made to the building in the 1980s, including the installation of a 16-by- 20-foot terrace along University Avenue SE, a dormer addition, and repairs to the cement masonry

[1] *University of Minnesota Greek Letter Chapter House Designation Study* (2003), 6.
[2] *University of Minnesota Greek Letter Chapter House Designation Study* (2003), 7.
[3] *University of Minnesota Greek Letter Chapter House District Design Guidelines* (2004), 6.

exterior. There have not been other significant exterior modifications to the building since its construction.

APPLICANT'S PROPOSAL. The applicant is proposing to remove the existing slate roof, which is original to the structure, and replace it with a synthetic tile roofing material that is manufactured by InSpire. The applicant states that many areas of the roof have broken or are missing tiles due to decades of exposure, and the existing roof is now leaking. The fasteners, flashings, and roof membrane are also failing and are in need of replacement. According to the applicant, repairing specific areas would not be effective in addressing the structural deterioration of the roof. Therefore, the applicant is proposing to completely remove and replace the roof with a material that is similar in size, texture, profile, and color to the existing slate tile. While the existing tile is approximately 11 inches wide, the proposed tiles would be approximately 11.5 inches in width, 18 inches in height, and have a 7.5-inch exposure. The proposed material would also be multi-colored (green, brown, and reddish-brown), which is similar to the original slate that was used on the roof. The applicant is proposing to reinstall any salvageable slate tiles from the roof and dormer walls after the ice and water barrier is in place.

The applicant has also noted that the project would include installing six-inch aluminum gutters with aluminum snow guards and downspouts along the roof overhangs. The existing dormer windows would remain, but the rotten window trim would be replaced and wrapped in aluminum coil to prevent future rot. Finally, the applicant is proposing to complete tuckpointing and brick replacement on the parapet end walls to halt additional deterioration, as needed.

PUBLIC COMMENTS. Staff has not received any comments regarding this project as of the printing of this report. Any correspondence received prior to the public meeting will be forwarded on to the Heritage Preservation Commission for consideration.

ANALYSIS

CERTIFICATE OF APPROPRIATENESS

The Department of Community Planning and Economic Development has analyzed the application to replace a historic slate roof with a synthetic slate roof, based on the following findings:

1. *The alteration is compatible with the designation of the landmark or historic district, including the period and criteria of significance.*

   The University of Minnesota Greek Letter Chapter House Historic District is significant for its properties' association with the Greek letter society's impact on the University of Minnesota during a great period of expansion, as well as with a distinctive type of 20th century residential architecture that reflects the vigor of the 1920s building boom.

   The applicant is proposing to remove the existing slate roof, which is original to the structure, and replace it with a synthetic tile roofing material that is similar in size, texture, profile, and color. While the existing tile is approximately 11 inches wide, the proposed tiles would be approximately 11.5 inches in width. The tiles would be 18 inches tall, overall, with a 7.5-inch exposure once they are overlaid. The proposed tile material would also be multi-colored (green, brown, and reddish-brown), which is similar to the original slate that was used on the roof and has now faded.

   The building would continue to be used as a fraternity house for its original chapter, Alpha Delta Phi. The proposed roof replacement would continue to communicate the building's significance as a 1920s chapter house within the historic district.

2. *The alteration will ensure the continued integrity of the landmark or historic district.*

The alteration would not negatively impair the integrity of the historic district. The preservation ordinance defines "integrity" as the authenticity of a landmark, historic district, nominated property under interim protection, or historic residence evidenced by the following seven factors:

Location: The University of Minnesota Greek Letter Chapter House Historic District is a noncontiguous district divided into two areas, "Fraternity Row" and "Sorority Row". "Fraternity Row" is the core of the district, extending east along University Avenue SE from 15th Avenue SE to 19th Avenue SE. The proposed work will not have an effect on the continued integrity of location. The existing building would remain in its original location on the property.

Design: The existing building is a three-story English Revival Style building that is clad with tan brick and smooth limestone trim. The irregular roofline has a gable roof clad in gray slate, with east-facing shed dormers. Stone-capped parapets terminate each gable end, and the predominant roof pitch is 12/12. An outdoor terrace was added along the ground floor of the building in 1983. The applicant's proposal to replace the roofing materials would have no effect on the brick and limestone building exterior. In addition, the roof pitch, style, and dormers would be retained and would be consistent with the English Revival architectural style of the building.

Setting: The site is located in the middle of the University of Minnesota's East Bank campus between Dinkytown and the TCF Bank Stadium. The area surrounding the property has experienced significant change since the building's construction in 1924 with the development of nearby sports arenas, academic buildings, student housing, and commercial buildings. However, most of the residential structures within the University of Minnesota Greek Letter Chapter House Historic District are still intact and retain their importance as contributing structures in the district.

Materials: The existing building retains the key exterior materials (tan brick and limestone trim) dating from the period of significance. The existing slate roof is also original to the building and dates to the period of significance. The applicant's proposal to replace the existing slate tiles with a synthetic material would have no effect on the brick and limestone building exterior.

Based on the evidence submitted by the applicant, the synthetic slate would be similar in texture, profile, and color to the original slate that was installed during the period of significance. The InSpire Classic Slate-S-Series tiles use limestone and virgin resins to mimic the texture of slate. The synthetic tiles have variation in their texture on the surface and around the edges, similar to true slate. The colors of the slate tiles consist of three colors in the "Concord" mix, which are similar to but more vivid than the existing, fading slate. The tiles are approximately one-half inch thick, 11.5 inches wide, 18 inches tall, and have a 7.5-inch exposure. The existing tiles are approximately 11 inches in width.

Workmanship: Staff finds that the installation methods proposed by the applicant will support the integrity of the workmanship of the historic building within the district. The applicant proposes to install an underlayment to create an ice, water, and fire barrier. The tiles would be fasted to the roof using stainless steel ring shanks and fasteners. Exposed fastener heads would be covered with an adhesive sealant that is compatible with slate to prevent rusting and water intrusion.

The applicant has also noted that the project would include installing six-inch aluminum gutters with aluminum snow guards and downspouts along the roof overhangs. The existing dormer windows would remain, but the rotten window trim would be replaced and wrapped in aluminum coil to prevent future rot. Finally, the applicant is proposing to complete tuckpointing and brick replacement on the parapet end walls to halt additional deterioration, as needed.

Feeling: The emergence of a thriving Greek letter system at the University of Minnesota reflected the tremendous growth and prosperity of the University during the first three decades of the 20th century. The rise and decline of Greek chapter membership revealed changing economic atmospheres, as well as students' evolving political and social ideas. Recognized as well for their highly symbolic, architecturally distinctive 20th century designs, the Fraternity and Sorority Row houses defined the northern edge of the campus. The proposed project will not alter the historic feeling of the district. The existing residential structure evokes an aesthetic or historic sense of the period of time corresponding with the district's period of significance.

Association: The existing structure would retain its association with the period of significance with the district. The property is used as a fraternity house, as consistent with its use during the district's period of significance. The replacement of the existing roof will not impact the property's association with the historic district.

3. *The alteration is consistent with the applicable design guidelines adopted by the commission.*

The *University of Minnesota Greek Letter Chapter House District Design Guidelines* were adopted in 2003 and provide the following applicable guidance for the applicant's proposal:

> **2. ROOFS, PARAPETS, AND CORNICES**
>
> e. Where slate roofing was part of the historic design, it should be conserved. If replacement is necessary, manufactured products that replicate the size, texture, profile, and color of the original may be acceptable.

While the roof was constructed during historic district's period of significance, its removal and replacement would not have a negative impact on the historic merit of the residential structure on the property or on surrounding buildings. The applicant has provided evidence that replacement of the historic roof is necessary. The applicant states that many areas of the roof have broken or are missing tiles due to decades of exposure, and the existing roof is now leaking. The fasteners, flashings, and roof membrane are also failing and are in need of replacement. According to the applicant, repairing specific areas would not be effective in addressing the structural deterioration of the roof. The pictoral evidence submitted by the applicant shows that there are white blotches of gypsum throughout the roof, which is evidence of significant weathering and delamination.[4]

In addition, the applicant's proposal is consistent with the guideline that replacement materials may be considered if they replicate the size, texture, profile, and color of the original slate roofing; the InSpire synthetic slate is similar to that of the original slate tile that is currently deteriorating.

4. *The alteration is consistent with the applicable recommendations contained in The Secretary of the Interior's Standards for the Treatment of Historic Properties.*

Staff finds that the proposed project is consistent with the following recommendations contained in *The Secretary of the Interior's Standards for the Treatment of Historic Properties*:

- The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
- Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

[4] Jeffrey S. Levine, *Preservation Briefs: The Repair, Replacement, and Maintenance of Historic Slate Roofs* (U.S. Department of the Interior National Park Service Cultural Resources, 1992) 7-8.

- Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
- New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

5. *The alteration is consistent with the spirit and intent of the preservation ordinance, the applicable policies of the comprehensive plan, and the applicable preservation policies in small area plans adopted by the city council.*

   The proposed roof replacement would be consistent with the following policies in the comprehensive plan:

   Heritage Preservation Policy 8.1: Preserve, maintain, and designate districts, landmarks, and historic resources which serve as reminders of the city's architecture, history, and culture.

   8.1.1 Protect historic resources from modifications that are not sensitive to their historic significance.

   Heritage Preservation Policy 8.7: Create a regulatory framework and consider implementing incentives to support the ethic of "reduce, reuse, and recycle" and revitalization for buildings and neighborhoods.

   8.7.1 Protect historic resources from demolition and explore alternatives to demolition.

   8.7.6 Encourage the recycling and reuse of building materials from demolitions and remodels in order to conserve natural resources and remove material from the waste stream.

   8.7.7 Work with private and public sector stakeholders to develop a salvage system that minimizes the loss of building materials, promotes the reuse of materials, and requires recycling containers to be present on-site with guidance on their use.

   The roof replacement would not result in a modification within the historic district that would negatively impair the property's historic significance or the significance of the district in which it is located. The materials and methods that the applicant is proposing would be sensitive to the historic significance of the existing property. The applicant is proposing to reinstall any salvageable slate tiles from the roof and dormer walls after the ice and water barrier is in place. The proposed alteration would contribute to the preservation of the chapter house, which retains its integrity as a contributing property within the historic district.

RECOMMENDATIONS

The Department of Community Planning and Economic Development recommends that the Heritage Preservation Commission adopt staff findings for the application by Patrick Miller, on behalf of Alpha Delta Phi, for the property located at 1725 University Avenue SE in the U of M Greek Letter Chapter House Historic District:

A. Certificate of appropriateness.

Recommended motion: **Approve** the certificate of appropriateness to allow the replacement of an historic slate roof with a synthetic slate roof, subject to the following conditions:

1. By ordinance, approvals are valid for a period of two years from the date of the decision unless required permits are obtained and the action approved is substantially begun and proceeds in a continuous basis toward completion. Upon written request and for good cause, the planning director may grant up to a one year extension if the request is made in writing no later than September 13, 2018.
2. By ordinance, all approvals granted in this certificate of appropriateness shall remain in effect as long as all of the conditions and guarantees of such approvals are observed. Failure to comply with such conditions and guarantees shall constitute a violation of this certificate of appropriateness and may result in termination of the approval.

ATTACHMENTS

1. BZH Map
2. Oblique aerial photo
3. Written description and findings submitted by applicant
4. Roof plans
5. Photos
6. Public comments

Alpha Delta Phi

NAME OF APPLICANT

2nd

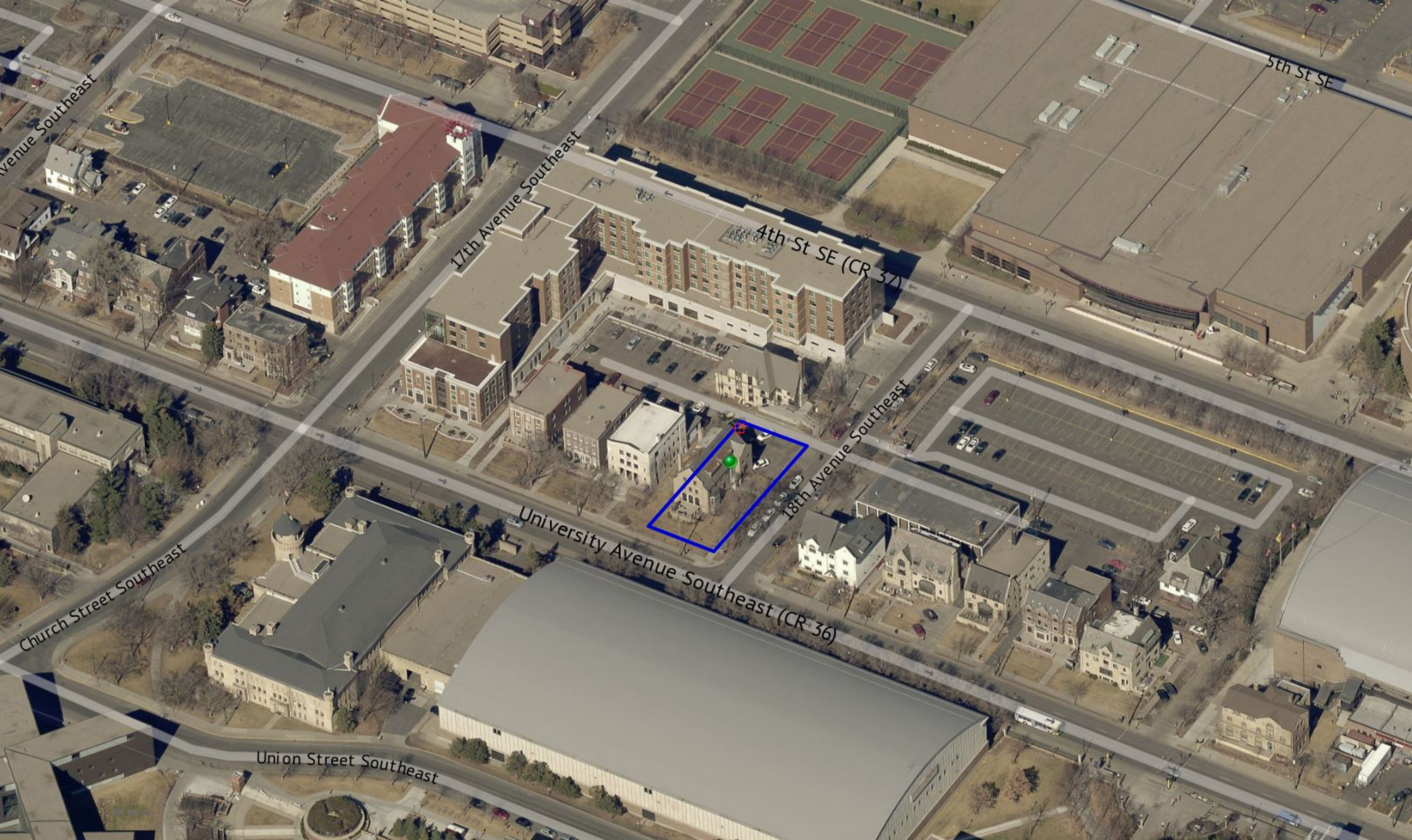
WARD

PROPERTY ADDRESS

1725 University Ave SE

FILE NUMBER

BZH-29307


Avenue Southeast
17th Avenue Southeast
4th St SE (CR 37)
5th St SE
18th Avenue Southeast
University Avenue Southeast (CR 36)
Church Street Southeast
Union Street Southeast

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Statement of proposed use and description of the project

Removal of the existing roof is necessary due to substantial damage to the tiles caused by age and exposure to elements such as rain, wind, snow, ice, UV rays, algae, and pollutants. The current slate roof is 91 years old and original to the structure, built in 1925. The slate has become extremely brittle.

Much of the existing slate tile is cracked, broken, or missing entirely. This creates a hazardous situation in which falling tile could cause damage to persons or property. Many of the fasteners are exposed to the elements, which is causing the fasteners to degrade though rusting and will cause further damage to the tiles that remain. In addition to the condition of the tile, the existing roof is leaking

The flashings that were installed at the roof valleys, chimneys, and dormers have failed. This failure of the roof membrane is allowing water to penetrate the decking below the tile into the attic and ultimately into the living facilities. The large and material amount of damage across the entire roof system is making it impossible to repair the existing slate tiles.

The roof membrane in its entirety must be replaced. If only specific areas are repaired, the remaining tile will continue to deteriorate and cause continued liability issues for the building's owner, and the same process of repair would need to be repeated year after year until the entire roof is eventually replaced. It is unlikely that we would be able to remove and replace the existing tiles without causing further damage in the case of repair. In any areas in which we would repair the existing tiles, we would need to apply an ice and water barrier to meet building code requirements. Meeting the requirements of the building code necessitates removal of the existing slate tile roof, repairing the damaged roof and fulfilling the requirements of the building code.

We have included photographic evidence proving that the majority of the roof is in extremely poor conditions. We have also included guidelines to help decide when to replace a roof. These guidelines are presented in "Preservation Briefs" from the US Department of the Interior, National Park Service, Cultural Resources, and Heritage Preservation Services.

Description of project:

ROOF:
All existing roofing materials must be removed from the roof and dormer walls down to the substrate to allow a clean surface.

MB Technologies Layfast TU 35 brand ice and water underlayment will be installed according to InSpire® manufacturer instructions and to meet local building codes. At the eaves the self-adhering ice and water barrier will extend 36" beyond the interior face of the exterior walls, and 3' for all sidewalls, headwalls, valleys, rakes, and roof penetrations. A felt underlayment meeting Class A Fire Rating (Single-layer ASTM D-226 30# felt) will be install on all parts of the roof deck not covered by the ice and water barrier. Felt edges will be lapped no less than 3" in the direction to shed water, no less than 6" over the ice and water barrier, and no less than 6" on side laps. Felt will be installed perpendicular to the roof slope.

Tiles will be fastened using stainless steel ring shank nails with two fasteners placed in the proper nail target area on each tile. Starter tiles will be installed ½" over the drip edge with approximately ¼" gap between the tiles. The first course of slate will be installed even with the edge of the starter course. The joints between the starter, first course, and all succeeding courses should be a minimum of 2" to ensure the nails are covered by the next course. Each course to be applied with a 7.5" exposure and a non-repeating straight line application.

Valley flashing will consist of 24" galvanized steel "W" open valley design, and be fastened every 2' using metal cleats. Galvanized steel dormer flashing will be installed over the tile and behind the galvanized steel counter flashing. Individual galvanized steel 8" x 8" step flashing will be installed at the end of each course of tiles whenever the roof comes into contact with a vertical wall and will overlap a minimum of 2". Galvanized steel plumbing stack flashings will be installed at each pipe. Ridge vent will be installed to achieve proper ventilation to remove moisture from the attic and extend the life of the roof system. Designated Classic Slate hip and ridge cap shingles will be installed over the ridge vent using 2 fasteners – one on each side. All exposed fastener head will be covered with an adhesive sealant that is compatible with slate to prevent rusting and water intrusion.

Existing tiles from the roof and dormer walls in salvageable condition will be set aside. After the Layfast ice and water is applied to the dormer walls, tiles, salvaged from the roof and dormer walls will be combined and re-installed.

The existing roof line will not be changed throughout this process; the roof will be replaced with InSpire® Classic Slate S-Series ½" thick synthetic slate tiles in Concord color. The tiles are 12" in width and 18" in height and will have a 7.5" exposure. InSpire® tiles carry an authentic slate texture and are created with a sustainable blend of limestone and virgin resins. As you can see in Photo "1", the existing tiles are approximately 11" in width. Photo "2" shows the InSpire® tiles are 11.5" in width, quite similar in size as to give the same appearance. Photo "3" shows a sample of the new tile next to the existing tile. The two products share many similar features in size, texture, and profile, and although the color of the new product is more vivid than those in the photo, the InSpire® product matches the color of the slate before it was affected by many years of weathering and sun exposure. The InSpire® product has been approved for use by Historical Preservation Committees across the United States and Canada as an alternative to natural slate roofing, and the product has proven to provide a longer life cycle for the roof. Flashings must be replaced to prevent water intrusion and to ensure the integrity of the entire roofing system.

GUTTERS:
6” aluminum gutters with aluminum snow guards and 4” fluted aluminum downspouts in Evergreen color will be installed on overhangs on the main roof. These will all be installed using aluminum mounting accessories. These gutters will replace the existing, failing gutters with the same material as is currently installed.

WINDOWS:
Existing windows on the dormers will remain, but the rotten window trim will be replaced and wrapped with aluminum coil. The aluminum coil will protect the wood from future rot and help in ease of maintenance due to the height and placement of the windows. These changes will not affect the aesthetics of the windows.

MASONRY:
Scaffolding will be installed around the chimneys to rebuild the top 2’ and tuck point the mortar joints 6’ from the top of each chimney. Tuck pointing will also be done on the parapet end walls with bricks being replaced as needed. The mortar joint size will be retained. Work is due to the crumbling bricks, failed flashing (see Photo “G”), and the years of inclement weather that caused damage to the structures and allowed water penetration. This is necessary to halt further deterioration.

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Certificate of Appropriateness:

1) **The alteration is compatible with the designation of the landmark or historic district, including the period and criteria of significance.**
   Nothing in this project would reduce the structure's ability to meet the City of Minneapolis designation of a landmark or historical district to "honor, preserve, and protect buildings or areas that represent and reflect elements of the city's cultural, social, economic, political, architectural, or design heritage." This project will in no way change the structure of the building. The steps involved in this project allow for replacing the deteriorating materials and replacing them to appear the same. The materials used are those that mimic the existing materials and provide a longer lasting alternative to preserve the structure's history for decades.

2) **The alteration will ensure the continued integrity of the landmark or historic district.**
   By replacing the existing deteriorating materials and replacing them with new, low maintenance materials that are similar in appearance and function, this will allow the fraternity to continue to exist within this structure for decades to come, which will in turn allow the organization the resources necessary to maintain the building aesthetically and financially, thus allowing the building to meet the expectations of one within the historic district.

3) **The alteration is consistent with the applicable design guidelines adopted by the commission.**
   Masonry: The mortar we are using to fill the joints will closely match that of the original material. The tuck pointing is necessary to halt deterioration of the brick and will match the original joint size.
   Roofing: Galvanized steel flashings will be used to replace all those existing. The same material is replacing that which is existing on the structure. As per point (e) in the design guidelines, the InSpire® roofing material to be used replicates the size, texture, profile, and color of the original material.
   Windows: Existing windows on the 3 dormers will remain, but the rotten trim will be replaced and wrapped in aluminum coil. replaced as well as the ripped screens. The aluminum cladding will protect the wood from future rot and help in ease of maintenance

due to the height and placement of the windows. These changes will not affect the aesthetics of the windows.

4) The alteration is consistent with the applicable recommendations contained in *The Secretary of the Interior's Standards for the Treatment of Historic Properties.*

The following addresses each of the items on the Secretary's standards -

a. The use of this property will not be changed by any of the steps in this project.

b. The historic character of the property will be retained. Salvageable historical materials will be re-used for installation on the dormer walls as is possible. The existing windows will not be removed, only the trim that is rotten will be replaced. The current galvanized steel gutters will be replaced with new gutters of the same material. The new synthetic slate tiles will have the same look, texture, and size of the natural slate being removed.

c. We will not be adding any features that will change the physical record of its time, place, and use.

d. There will be no changes that have historical significance. We are replacing existing materials with same materials or materials that are designed to look and act as those we are removing.

e. The craftsmanship offered on this project will mimic that of the original craftsmanship used to install the products originally.

f. The severity of deterioration of the natural slate tile requires the entirety of the roof to be replaced, rather than repaired. The new material matches the old in size, design, color, and texture as shown in the photos provided. Historical Preservation Committees across the United States have approved this product to be substituted for natural slate and submitted documentation from these committees show they believe this material meets the Secretary of Interior's Standards.

g. Cleaning of the mortar on the brick was not appropriate, as it would add to the deterioration of the chimneys.

h. There are no archaeological resources affected by this project.

i. There are no new additions with this project.

j. Removal of any of the steps in this project would not impair the integrity of the historic property.

5). The alteration is consistent with the spirit and intent of the preservation ordinance, the applicable policies of the comprehensive plan, and the applicable preservation policies in small area plans adopted by the city council.

This project is necessary in order to preserve the structure. The existing slate roof was not maintained through the years. The structure has been damaged due to water leaks in the roof. If the roof, flashings, and mortar are not replaced, the structure will continue to incur damage and deterioration. Ongoing property maintenance is listed in policy 8.6 of the Conservation Plan, Heritage Preservation chapter adopted by the Minneapolis city council.

In this project we are attempting to re-use some of the existing slate roofing materials to be installed on the dormer walls, thus salvaging historically significant building materials (policy 8.7.5) As much as possible the remaining materials will be recycled (policy 8.7.6)

29 PRESERVATION BRIEFS

The Repair, Replacement, and Maintenance of Historic Slate Roofs

Jeffrey S. Levine

U.S. Department of the Interior
National Park Service
Cultural Resources
Heritage Preservation Services

Introduction

Slate is one of the most aesthetically pleasing and durable of all roofing materials. It is indicative at once of the awesome powers of nature which have formed it and the expertise and skill of the craftsman in hand-shaping and laying it on the roof. Installed properly, slate roofs require relatively little maintenance and will last 60 to 125 years or longer depending on the type of slate employed, roof configuration, and the geographical location of the property. Some slates have been known to last over 200 years. Found on virtually every class of structure, slate roofs are perhaps most often associated with institutional, ecclesiastical, and government buildings, where longevity is an especially important consideration in material choices. In the slate quarrying regions of the country, where supply is abundant, slate was often used on farm and agricultural buildings as well.

Because the pattern, detailing, and craftsmanship of slate roofs are important design elements of historic buildings, they should be repaired rather than replaced whenever possible. The purpose of this Preservation Brief is to assist property owners, architects, preservationists, and building managers in understanding the causes of slate roof failures and undertaking the repair and replacement of slate roofs. Details contributing to the character of historic slate roofs are described and guidance is offered on maintenance and the degree of intervention required at various levels of deterioration.

The relatively large percentage of historic buildings roofed with slate during the late nineteenth and early twentieth centuries means that many slate roofs, and the 60 to 125 year life span of the slates most commonly used, may be nearing the end of their serviceable lives at the end of the twentieth century. Too often, these roofs are being improperly repaired or replaced with alternative roofing materials, to the detriment of the historic integrity and appearance of the structure. Increased knowledge of the characteristics of slate and its detailing and installation on the roof can lead to more sensitive interventions in which original material is preserved and the building's historic character maintained. Every effort should be made to replace deteriorated slate roofs with new slate and to develop an effective maintenance and repair program for slate roofs that can be retained.

History of Slate Use in the United States

Although slate quarrying was not common in the United States until the latter half of the nineteenth century, slate roofing is known to have been used prior to the Revolution. Archeological excavations at Jamestown, Virginia,have unearthed roofing slate in strata dating from 1625-1650 and 1640-1670. Slate roofs were introduced in Boston as early as 1654 and Philadelphia in 1699. Seventeenth century building ordinances of New York and Boston recommended the use of slate or tile roofs to ensure fireproof construction.

In the early years of the Colonies, nearly all roofing slate was imported from North Wales. It was not until 1785 that the first commercial slate quarry was opened in the United States, by William Docher in Peach Bottom Township, Pennsylvania. Production was limited to that which could be consumed in local markets until the middle of the nineteenth century. Knowledge of the nation's abundant stone resources was given commercial impetus at this time by several forces, including a rapidly growing population that demanded housing, advances in quarrying technology, and extension of the railroad system to previously inaccessible markets. Two additional factors helped push the slate industry to maturity: the immigration of Welsh slate workers to the United States and the introduction of architectural pattern and style books (Figure 1). Slate production increased dramatically in the years following the Civil War as quarries were opened in Vermont, New York, Virginia, and Lehigh and Northampton Counties, Pennsylvania. By 1876, roofing slate imports had all but dried up and the United States became a net exporter of the commodity.

Repair/Replacement Guideline

The following guideline is provided to assist in the repair/replace decision making process:

1. Consider the age and condition of the roof versus its expected serviceable life given the type of slate employed.

2. Calculate the number of damaged and missing slates. Is the number less than about 20%? Is the roof generally in good condition? If so, the roof should be evaluated for repair rather than replacement. Also, keep in mind that the older a roof becomes, the more maintenance it will likely require.

3. Determine if there are active leaks and what their source may be. Do not assume the slates are leaking. Gutters, valleys and flashings are more likely candidates. "False leaks" can be caused by moisture condensation in the attic due to improper ventilation.

4. Check the roof rafters and sheathing for moisture stains. Poke an awl into the wood to determine if it is rotted. Remember that very old, delaminating slates will hold moisture and cause adjacent wood members to deteriorate even if there are no apparent leaks.

5. Are many slates sliding out of position? If so, it may be that ferrous metal fasteners were used and that these are corroding, while the slates are still in good condition. Salvage the slates and re-lay them on the roof. If the slates have worn around the nails holes, it may be necessary to punch new holes before re-laying them.

6. Consider the condition of the roof's flashings. Because slate is so durable, metal flashings often wear out before the slate does. Examine the flashings carefully. Even the smallest pinhole can permit large quantities of water to enter the building.

7. Is the deterioration of the slate uniform? Often this is not the case. It may be that only one slope needs replacement and the other slopes can be repaired. In this way, the cost of replacement can be spread over many years.

8. Press down hard on the slates with your hand. Sound slates will be unaffected by the pressure. Deteriorated slates will feel brittle and will crack. Tap on slates that have fallen out or been removed. A full, deep sound indicates a slate in good condition, while a dull thud suggests a slate in poor condition.

9. Are new slates readily available? Even if replacement is determined to be necessary, the existing roof may have to be repaired to allow time for documentation and the ordering of appropriate replacement slates.

Figure 24. Although slate replacement roofs are expensive, the superiority of materials and craftsmanship will give years of continued service. If amortized over the life of the roof, the replacement cost can be very reasonable. Photograph courtesy of the National Park Service.

Note: measurements in this publication are given in both U.S. Customary System and International (Metric) System for comparative purposes. Metric conversions are in some cases approximate and should not be relied upon in preparing technical specifications.

Acknowledgements

The author, **Jeffrey S. Levine,** is an Architectural Conservator with John Milner Associates, Inc., and gratefully acknowledges the technical review of this publication by the following: Russel Watsky, Watsky Associates; Kenton Lerch, The Structural Slate Company; Matt Millen, Millen Roofing Co.; Alex Echeguren, Echeguren Slate Company; Bill Markcrow, Vermont Structural Slate Company; and Dick Naslund, Department of Geological Sciences, State University of New York at Binghamton. In addition, invaluable comments were provided by Sharon Park, Doug Hicks and Michael J. Auer, National Park Service; Suzanna Barucco, Martin Jay Rosenblum, R.A. & Associates; and Fred Walters, John Milner Associates, Inc. All photographs are by the author unless otherwise noted.

Sharon C. Park, AIA, Senior Historical Architect, Preservation Assistance Division, National Park Service, is credited with directing the development of this publication and with its technical editorship. This publication has been prepared pursuant to the National Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. Comments on the usefulness of this publication may be directed to H. Ward Jandl, Chief, Technical Preservation Services Branch, Preservation Assistance Division, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127. Drawings for this publication were prepared by Karin Murr Link.

ISSN: 0885-7016

Spring 1993

Cover Photograph: A portion of an advertisement for Slatington-Bangor Slate Syndicate (Slatington, PA) which appeared in the July 1910 issue of Building Age *(Vol.32 No.7).*

INSPIRE®
ROOFING PRODUCTS

955 Columbia Street, Brea, CA 92821 • 800-237-6637 • www.InspireRoofing.com

Inspire Roofing has been working with Regional Historical Societies around the US to repair of our prised historical structures sence 2007. InSpire tiles carry an authentic slate texture with a sustainable blend of limestone and virgin resins. InSpire's colors include a full range of historically-sensitive shades such as Charcoal Grey, Brandywine and Sage Green, along with exclusive blended-color tiles that feature grey color mixes.

Below is a listing of various areas in the U.S where InSpire Roofing Products have been approved for installation by Historical Preservation Committees:

- Anheuser Busch – 1868 Lyon School
- National Zoo, Washington, DC
- Tomah VA Medical Center, Tomah, WI**
- Kirkwood Church, St. Louis, MO
- St. Patrick's Church, Hamilton, Ontario, Canada
- St. Paul's Church, Flint, MI
- Scott Air Force Base
- Salisbury University
- Historic District- City of New Orleans**
- Howe House Project , Ohio & Erie Canal Coalition**

** Document attached. Further documents are available.

Inspire slate roofing is the approved alternitave when US Natural Slate is to heavy for aging structures, cost prohibitive or in short supply.

A substitution request can be provided upon request.

Thank you for your consideration,

Atlantic Premium Shutters®

Below is a listing of various areas in the U.S where Atlantic Premium Shutters have been approved for installation by Historical Preservation Committees:

- Historical district of Charleston, SC
- Historical district of Wilmington, NC
- Historical district of St. Augustine, FL
- Historical district of Mobile, AL
- Historical district of Savannah, GA
- Historic Holy Cross neighborhood of New Orleans, LA
- Ibor section of Tampa, FL
- Dartmouth College
- Cape May Lighthouse, NJ

Reasons for choosing Atlantic Premium Shutters as replacement shutters:

- Historically and architecturally correct shutters that are custom handcrafted using the most advanced modern materials.
- Made with "old world craftsmanship" from component parts that guarantee a beautiful 100% authentic look.
- Proprietary finish process that uses cutting edge marine grade paint that is oven cured to a hard shell and provides a maintenance free finish.
- Maintenance free shutters backed by a limited lifetime warranty on structure and finish.

INSPIRE® ROOFING PRODUCTS

Below is a listing of various areas in the U.S where InSpire Roofing Products have been approved for installation by Historical Preservation Committees:

- Anheuser Busch – 1868 Lyon School
- National Zoo, Washington, DC
- Kirkwood Church, St. Louis, MO
- St. Patrick's Church, Hamilton, Ontario, Canada
- St. Paul's Church, Flint, MI
- Scott Air Force Base
- Salisbury University
- Howe House Project , Ohio & Erie Canal Coalition

Reasons for choosing InSpire as an alternate to repairing a slate roof:

- Passes the UL test for Class 4 Hail
- Less likely to crack or delaminate from weathering
- Utilize real mined slate for our molds to give it authentic and random appearance
- Pigment color is part of the product. There is no painted surface, which provides longer life cycle on the colors
- 50 year limited lifetime warranty

In an event where you can't repair your shutters or slate, let us help you replicate your look with our custom solutions.
Our shutters and synthetic slate tiles are approved by Historical Preservation Committees around the U.S.

For additional information, please contact Brian Martucci at 330-923-6842

WISCONSIN HISTORICAL SOCIETY

September 27, 2011

Mr. Kurt Marshaus
Tomah VA Medical Center
500 E. Veterans Street
Tomah, WI 54660

SHSW#: 11-0932/MO
RE: Building 23 and Building 44 Roof Replacement

Dear Mr. Marshaus:

We have reviewed your submittal of September 21, 2011 regarding the above referenced project. The installation of a composite slate roof (Inspire, color 701-stone black) on Building 404 and an asphalt shingle roof (CertainTeed Landmark, color Moire Black) on Building 23 meets the Secretary of the Interior's Standards. Therefore the proposed undertaking will result in no adverse effect to the historic district pursuant to 36 CFR 800.5(b).

.

Please call me at (608) 264-6507 if you have any questions concerning these matters.

Sincerely,

Sherman Banker
Wisconsin State Historic Preservation Office

NEW ORLEANS HISTORIC DISTRICT LANDMARKS COMMISSION
CENTRAL BUSINESS DISTRICT HISTORIC DISTRICT LANDMARKS COMMISSION

C. RAY NAGIN
MAYOR

CITY OF NEW ORLEANS

C. ELLIOTT PERKINS
EXECUTIVE DIRECTOR

August 28, 2007

Brian Martucci
The Tapco Group
3457 Windham Circle
Cuyahoga Falls, OH 44223

Re: Inspire Composite Roof Tiles

Dear Mr. Martucci:

The Historic District Landmarks Commission is the City of New Orleans' regulatory agency for local historic districts outside of the Vieux Carre. Recently, the Inspire Composite Roof Tiles as manufactured by the Tapco Group were approved for use on most of the buildings in the historic districts under our jurisdiction. Although the process for changes to historic properties requires that each change be taken on a case by case basis, the Commission has approved their use as an alternative to natural Slate roofing.

If you have any questions concerning this matter, please feel free to contact the staff at (504) 658-7040. Our guidelines and procedures may be found on our website at www.cityofno.com.

Sincerely,

Tracy A St. Julien

Tracy St. Julien
Senior Architectural Historian

1340 POYDRAS STREET, SUITE 1152 | NEW ORLEANS, LOUISIANA | 70112
PHONE 504.658.7040 | FAX 504.658.3802
WWW.CITYOFNO.COM

CERTIFICATE OF APPROPRIATENESS

The Flint Historic District Commission, having reviewed the attached plans for:

___ Addition
___ Alteration
___ Demolition
___ partial
___ total
___ Moving
___ New Construction
___ Reconstruction
___ Rehabilitation
___ Repair
___ Restoration
_X_ Other

at the district resource located at 711 S. **Saginaw Street** , at the **August 6, 2007** meeting of the Flint Historic District Commission hereby issue a

CERTIFICATE OF APPROPRIATENESS

This Certificate is issued to **St. Paul Episcopal Church**
711 S. Saginaw Street
Flint, MI 48502

This Certificate of Appropriateness is issued based on the following:

Re-roof Parish House with synthetic slate (Inspire Roofing Products), copper flashing, and ice and water shield.

Carol Freeman
Grant Development Coordinator
Flint Historic District Commission

Distribution:

_X_ Owner
___ Building and Safety Inspections
___ HDC File

Projects of Note

- Anheuser Busch – 1868 Lyon School
  (Original A.B. headquarters)
- National Zoo, Washington, D.C.
- Kirkwood Church, St. Louis, MO
- St.Patrick's Church, Hamilton, Ontario, Canada
- St.Paul's Church, Flint, MI
- Scott Air Force Base
- Salisbury University

INSPIRE®
ROOFING PRODUCTS

Breathing Life into a 173 Year-Old Ohio Historical Building

Until very recently, the Richard Howe House in Akron, Ohio was a neglected, blue-painted eyesore. The former mansion built in 1836 had been the home of the resident engineer of the Ohio & Erie Canalway, whose transportation project transformed northeastern Ohio into a bustling commercial center critical to many areas of a young America. Over subsequent decades, the Howe House took various turns, being home to an antique shop, grocery store and even a tattoo parlor. Thanks to a painstaking renovation, it is now a restored architectural showpiece that sits two blocks from its original location.

On June 30, 2008, the fragile three-story building, weighing 400 tons, was precisely raised onto a fleet of remote-controlled eight-wheel tractors and slowly rolled the two blocks to its new site. The three-hour spectacle fascinated hundreds who watched the building crawl along its way, taking up the width of the closed four-lane roadway. From there, the on-site rehabilitation of the building lasted 16 months. Unseemly pale blue gave way to vibrant red brick and a glimpse into history.

"The Howe House had been forgotten, but it's been turned into a jewel in downtown Akron," said Dan Rice, CEO of the Ohio & Erie Canalway Coalition (OECC). "The community is very surprised, even somewhat shocked to see how beautiful the house is."

A partnership between the OECC and City of Akron allowed the $2.2 million project to come to fruition. The home, one of only two remaining historical high Federal style structures in the city, was in danger of being demolished to make way for new development. With the risk of losing the building to history, the coalition, which was committed to restoring the house and moving its offices there, decided to pick it up, re-site it and rehabilitate it. The OECC engaged Braun and Steidl Architects.

"Our design process included researching the architectural style in order to restore or duplicate features that would have been part of the house during the year 1886," said Phil Steinberg, AIA, CSI, of Braun and Steidl Architects.

Significant time was spent restoring the floor plan. "Basically, two thirds of the first floor walls were missing from the original building because there had been multiple additions over the years. This included designing temporary structural shoring systems to support those openings where they had put the additions on so that restorations could be completed," Steinberg explained.

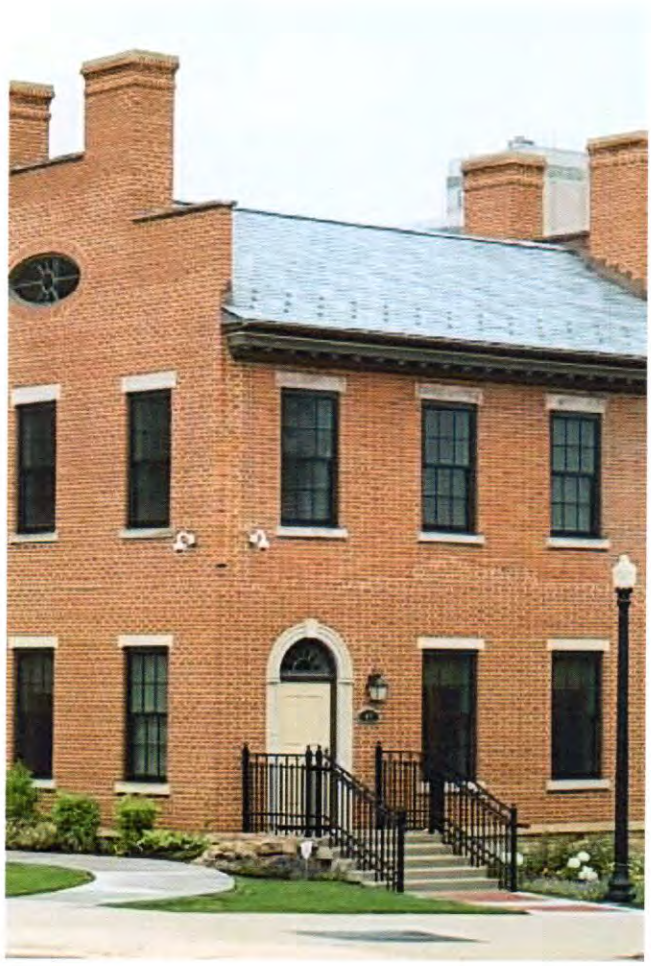
In addition to load-bearing elements, the Federal style stone lintels and door surrounds were restored along with historical dentil trim and double-hung windows. Foundation stones from the home were salvaged and used as exterior veneer.

For the structure's roof, Braun and Steidl spec'd The Tapco Group's InSpire Roofing brand. The composite slate is often used on historical projects and was already familiar to the firm. InSpire tiles carry an authentic slate texture, but in a sustainable blend of limestone and virgin resins.

"There was slate roofing added at some point in the home's history during the selected time period we were trying to comply with. We used a historical color blend for the roof as well as the other colors on the façade to match the 1886 appearance," Steinberg noted. "InSpire really does a wonderful job of complementing the historical renovation of this structure," Rice added.

A mix of three roofing colors was used; 40 percent Slate Grey, 40 percent Pewter Grey and 20 percent Dover Grey. InSpire's 25 colors include a full range of historically-sensitive shades such as Charcoal Grey, Plum and Emerald Green, along with exclusive blended-color tiles that feature grey color mixes. The ratio of grey hues used was a joint recommendation from Braun and Steidl and In- Spire. "We sat down with the InSpire people and had extensive conversations on historical aesthetics," Rice said. "We clearly recognized the need to rely on their expertise."

To install the new roofing, general contractor Welty Construction turned to USA Roofing, Inc. of Twinsburg, Ohio, a company specializing in commercial shingle roofing on structures like large churches, hotels, banks and school buildings. "When I stand across the street, I can't tell the difference between this composite and natural slate," said Dusty Basmagy, project roofer with USA Roofing. "The InSpire roof looks good. If I had a 150-year old house, I would consider installing it."



Nationally, InSpire is installed on museum buildings, historical churches and other landmark structures. It is also used to discern homes of various architectural styles, from a Queen Anne mansion in Beverly Hills to a massive mountaintop estate in the slate-heritage area of eastern Pennsylvania.

"You wouldn't know that those tiles are a synthetic product with recycled content. They are very, very beautiful," said Rice. "We have several other historical projects that we're working on and we hope to partner with InSpire again."

Below the revitalized slate roofline, more choices and challenges had loomed. Braun and Steidl had to find a matching brick similar to the handmade brick of the 1836 façade. They also had to analyze the composition of the home's lime putty mortar to restore the original brick walls.
Because a particular section of the building could not be moved, there was also a need to recreate an historical addition to the home. Now, that addition sits just off the water's edge of the canal, with doors opening to overlook the project that Richard Howe spent so many years on.

Inside the rejuvenated Howe House, the first floor entryway contains a visitor's information center with a main exhibit space and an area for exploring the heritage of Richard Howe, "whose canal-building mission is the very reason for why Akron came into being," Rice noted.

"The Howe House was in very sad shape, really deprived due to a lot of deferred maintenance. We've been able to turn a local eyesore into a regional destination," Rice said. "It's very exciting to see the ideas and dreams that people had for this structure realized."

"Our vision was to restore the Howe House to a recognizable historical structure," said Steinberg. "We're very pleased with the way it has come out and happy that we could restore the building back to its 1886 appearance. From the state it was in before it was moved to the new location, you would never have recognized the beauty that was hidden inside.

InSpire Roofing Products is a part of The Headwaters Roofing Division group of roofing manufacturing companies, and is a U.S. Green Building Council Member. For more information, visit: www.inspireroofing.com or call 1-800-971-4148.

Precise Aerial Measurement Report

Prepared for you by Patrick Miller Construction, Inc.

1725 University Ave SE, Minneapolis, MN 55414-2023

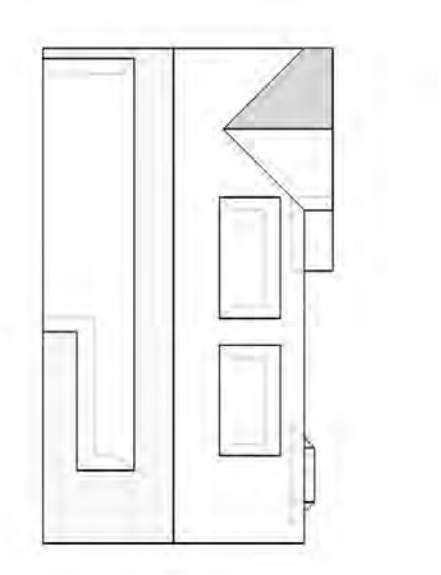
Patrick Miller Construction, Inc.
8140 Arthur St NE
Spring Lake Park, MN 55432

Patrick Miller
tel. 612-221-1884
email: patricksmiller@me.com
pmillerconstruction.com

Premium Report

April 6, 2016

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439



In this 3D model, facets appear as semi-transparent to reveal overhangs.

PREPARED FOR

Contact:	Patrick Miller
Company:	Patrick Miller Construction, Inc.
Address:	8140 Arthur St NE Spring Lake Park, MN 55432
Phone:	612-221-1884

TABLE OF CONTENTS

MEASUREMENTS

Total Roof Area =3,193 sq ft
Total Roof Facets =11
Predominant Pitch =12/12
Number of Stories >1
Total Ridges/Hips =85 ft
Total Valleys =37 ft
Total Rakes =126 ft
Total Eaves =191 ft
Total Penetrations =9
Total Penetrations Perimeter = 71 ft
Total Penetrations Area = 43 sq ft

Measurements provided by www.eagleview.com

Certified Accurate

www.eagleview.com/Guarantee.aspx

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

IMAGES

The following aerial images show different angles of this structure for your reference.

Top View

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

IMAGES

North Side

South Side

IMAGES

East Side

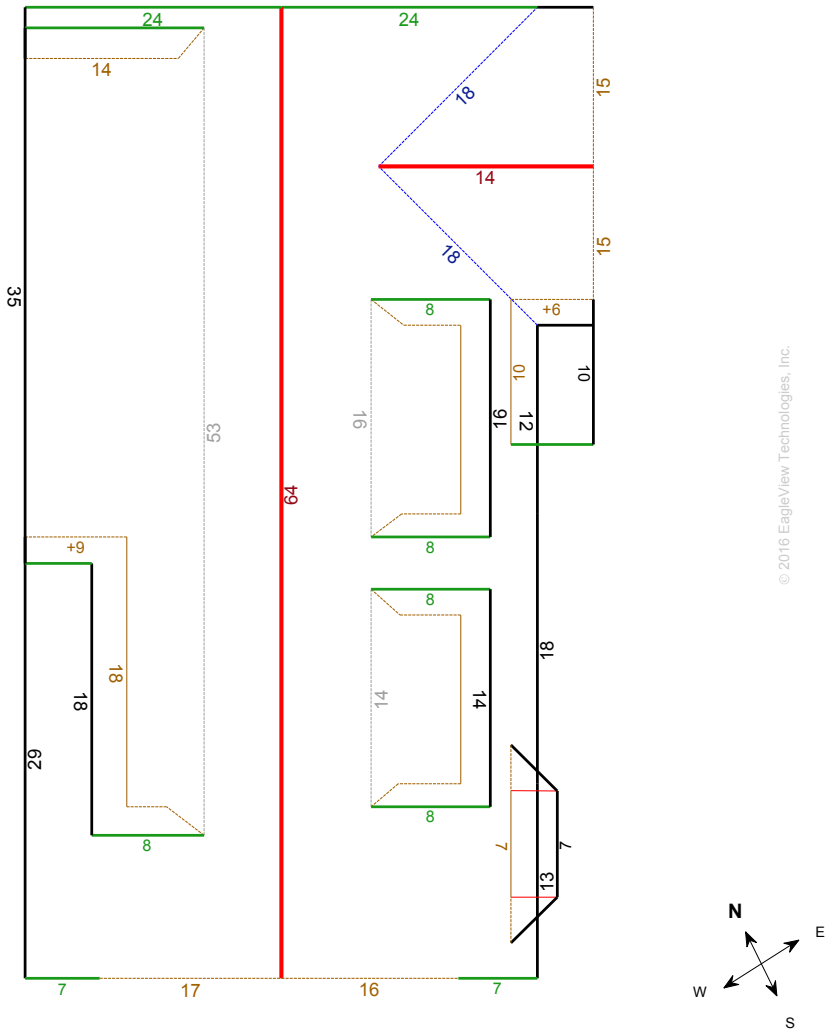
West Side

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

LENGTH DIAGRAM

Total Line Lengths:

Ridges = 78 ft
Hips = 7 ft
Valleys = 37 ft
Rakes = 126 ft
Eaves = 191 ft
Flashing = 58 ft
Step flashing = 145 ft
Parapets = 0 ft

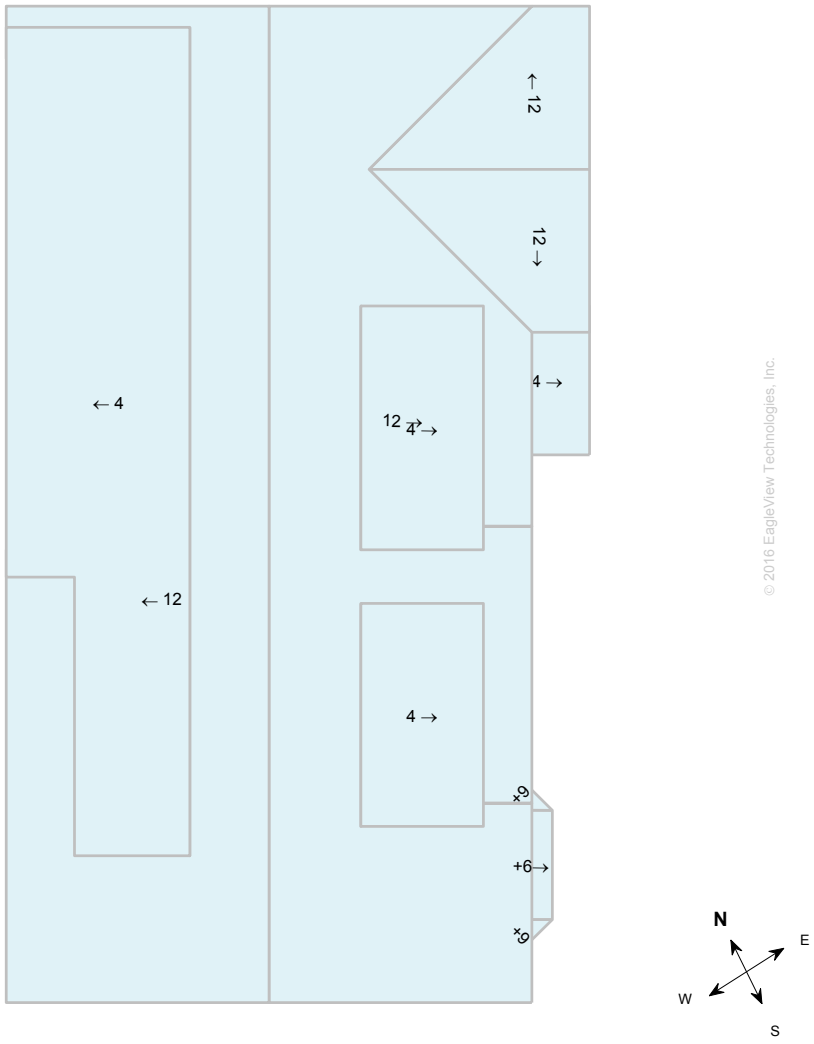


Note: This diagram contains segment lengths (rounded to the nearest whole number) over 5 feet. In some cases, segment labels have been removed for readability. Plus signs preface some numbers to avoid confusion when rotated (e.g. +6 and +9).

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

PITCH DIAGRAM

Pitch values are shown in inches per foot, and arrows indicate slope direction. The predominant pitch on this roof is 12/12.

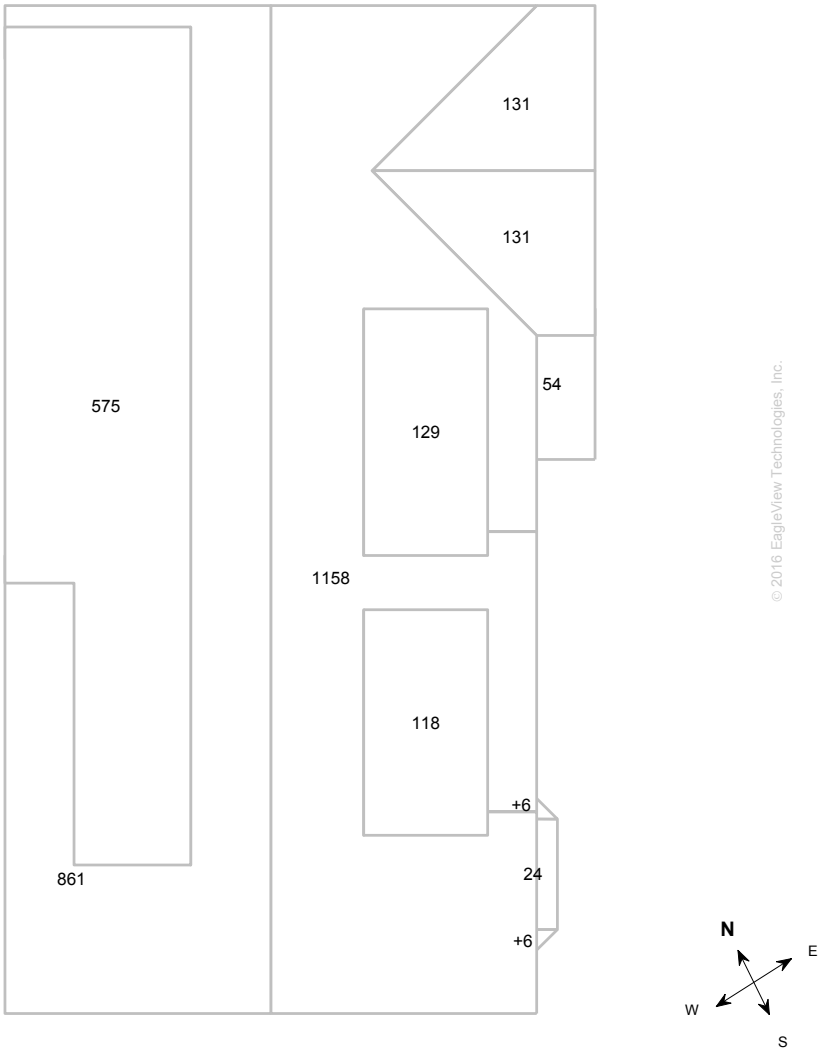


Note: This diagram contains labeled pitches for facet areas larger than 20 square feet. In some cases, pitch labels have been removed for readability. Blue shading indicates a pitch of 3/12 and greater.

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

AREA DIAGRAM

Total Area = 3,193 sq ft, with 11 facets.

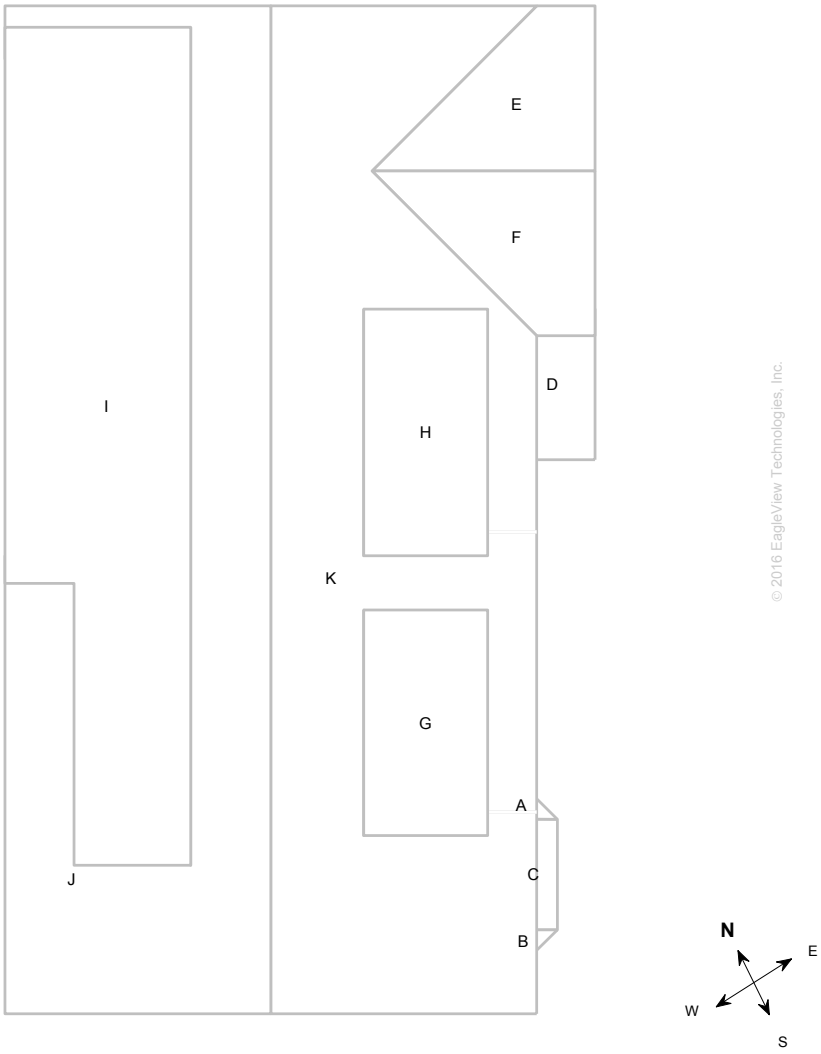


Note: This diagram shows the square feet of each roof facet (rounded to the nearest foot). The total area in square feet, at the top of this page, is based on the non-rounded values of each roof facet (rounded to the nearest square foot after being totaled).

1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

NOTES DIAGRAM

Roof facets are labeled from smallest to largest (A to Z) for easy reference.



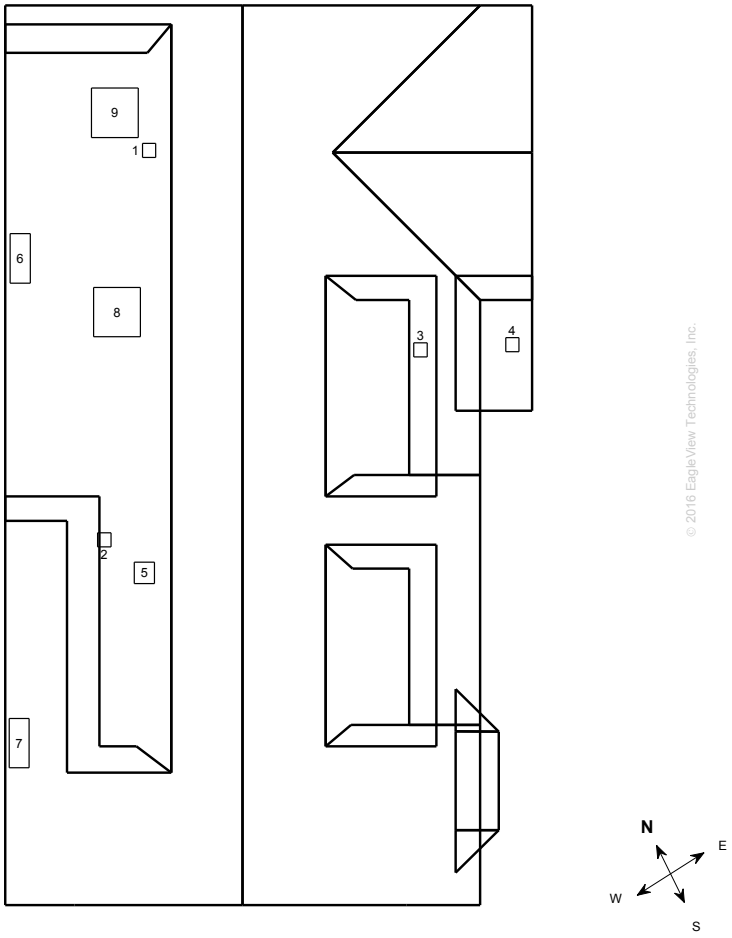
1725 University Ave SE, Minneapolis, MN 55414-2023 Report: 13741439

PENETRATIONS NOTES DIAGRAM

Penetrations are labeled from smallest to largest for easy reference.

Total Penetrations = 9
Total Penetrations Perimeter = 71 ft

Total Penetrations Area = 43 sq ft
Total Roof Area Less Penetrations = 3,150 sq ft



REPORT SUMMARY

Areas per Pitch				
Roof Pitches	4/12	6/12	9/12	12/12
Area (sq ft)	876.4	23.8	11.2	2281.9
% of Roof	27.4%	0.7%	0.4%	71.5%

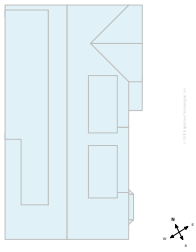
The table above lists each pitch on this roof and the total area and percent (both rounded) of the roof with that pitch.

Waste Calculation Table							
Waste %	**0%**	**10%**	**12%**	**15%**	**17%**	**20%**	**22%**
Area (sq ft)	3,193	3,512	3,576	3,672	3,736	3,832	3,895
Squares	31.9	35.1	35.8	36.7	37.4	38.3	39.0

This table shows the total roof area and squares (rounded up to the nearest decimal) based upon different waste percentages. The waste factor is subject to the complexity of the roof, individual roofing techniques and your experience. Please consider this when calculating appropriate waste percentages. Note that only roof area is included in these waste calculations. Additional materials needed for ridge, hip, valley, and starter lengths are not included.

Penetrations	1-4	5	6	7	8-9					
Area (sq ft)	1	2.2	5.3	7	12.2					
Perimeter (ft)	4	6	10	11	14					

Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.



Total Roof Facets = 11
Total Penetrations =9

Lengths, Areas and Pitches

Ridges = 78 ft (2 Ridges)
Hips = 7 ft (2 Hips).
Valleys = 37 ft (2 Valleys)
Rakes* = 126 ft (12 Rakes)
Eaves/Starter** = 191 ft (15 Eaves)
Drip Edge (Eaves + Rakes) = 317 ft (27 Lengths)
Parapet Walls = 0 (0 Lengths).
Flashing = 58 ft (5 Lengths)
Step flashing = 145 ft (20 Lengths)
Total Area = 3,193 sq ft
Total Penetrations Area = 43 sq ft
Total Roof Area Less Penetrations = 3,150 sq ft
Total Penetrations Perimeter = 71 ft
Predominant Pitch = 12/12

Property Location

Longitude = -93.2310658
Latitude = 44.9776656

Notes

This was ordered as a commercial property. There were no changes to the structure in the past four years.

* Rakes are defined as roof edges that are sloped (not level).
** Eaves are defined as roof edges that are not sloped and level.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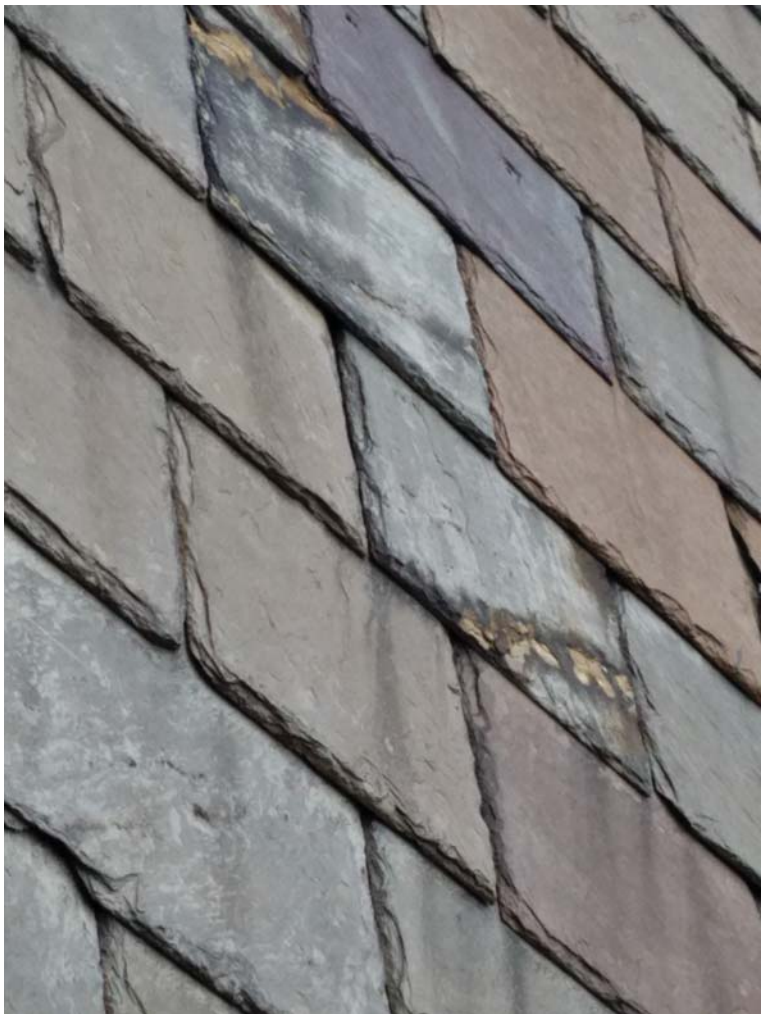
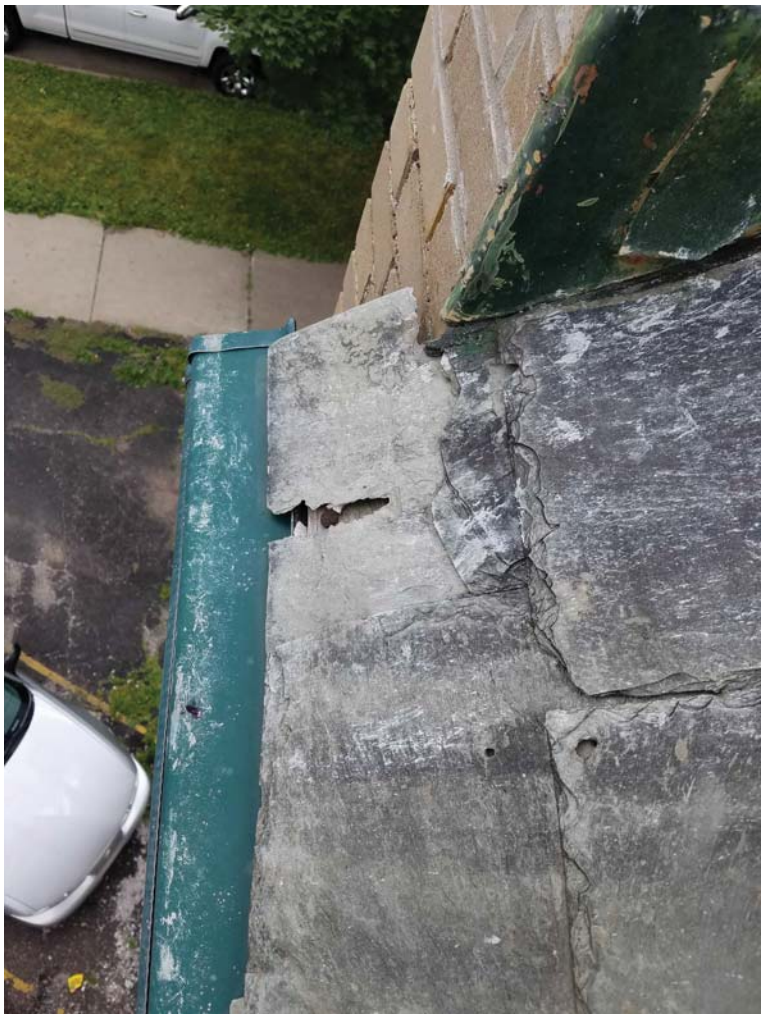
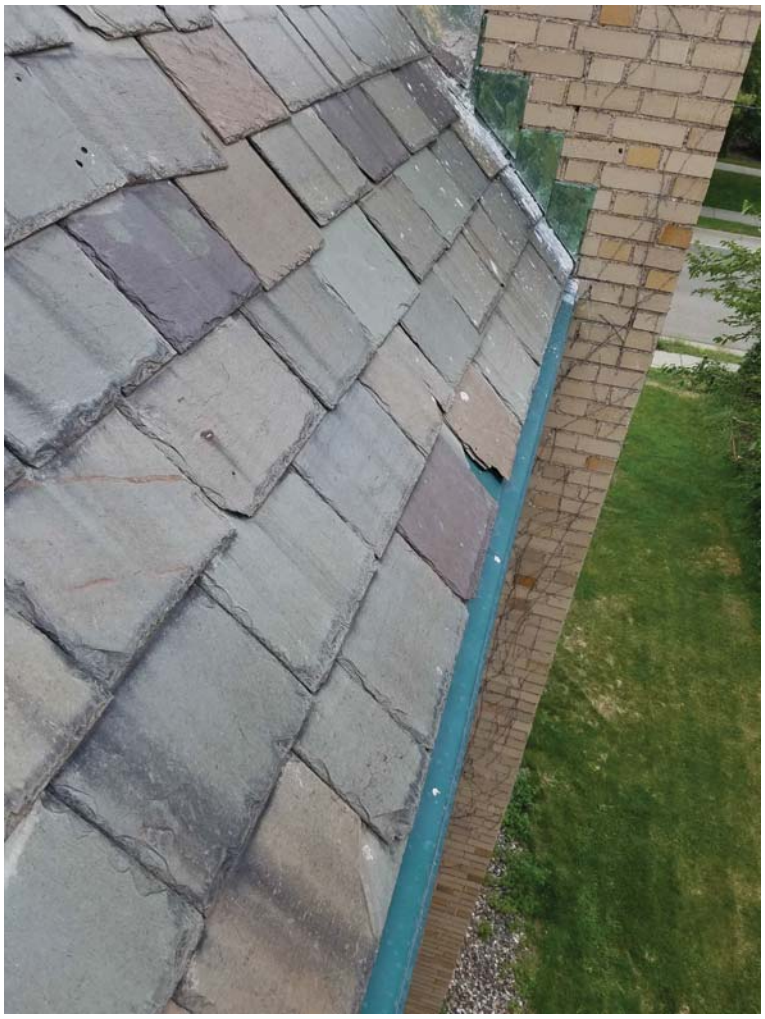
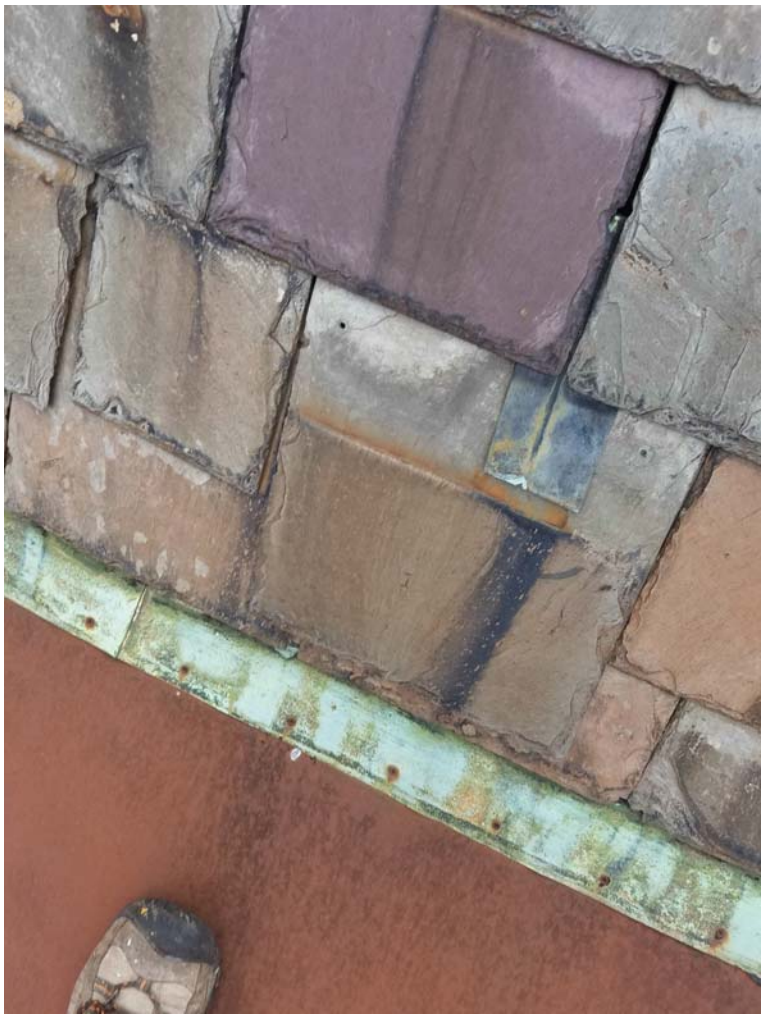
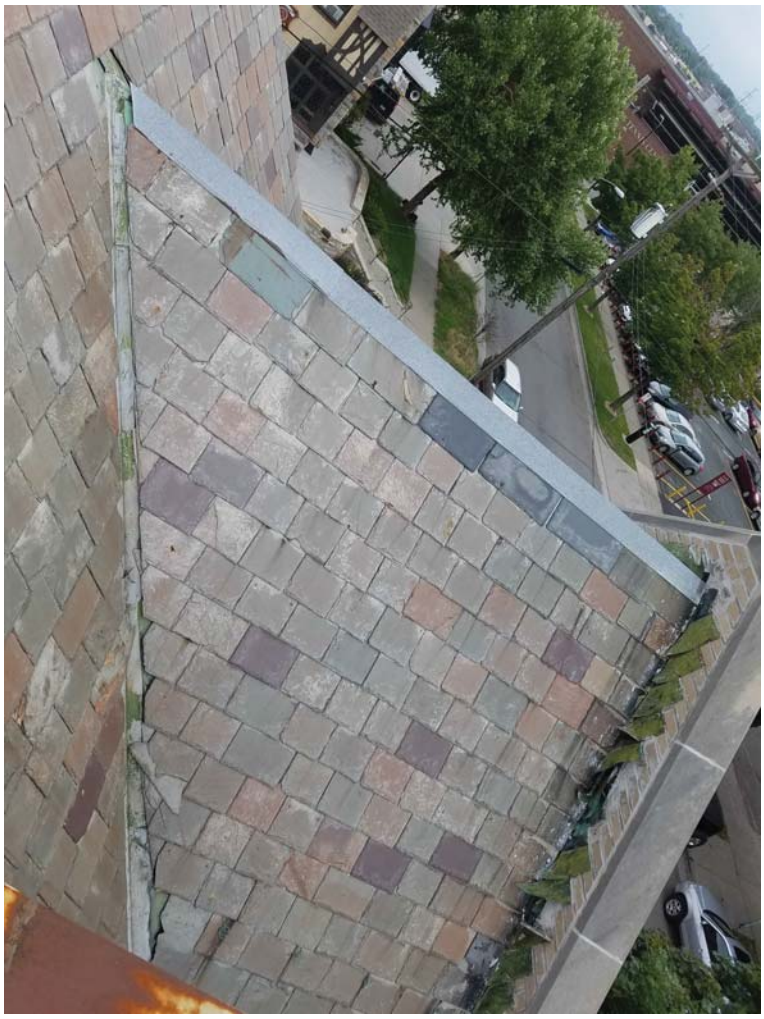
ROOFING PRODUCTS

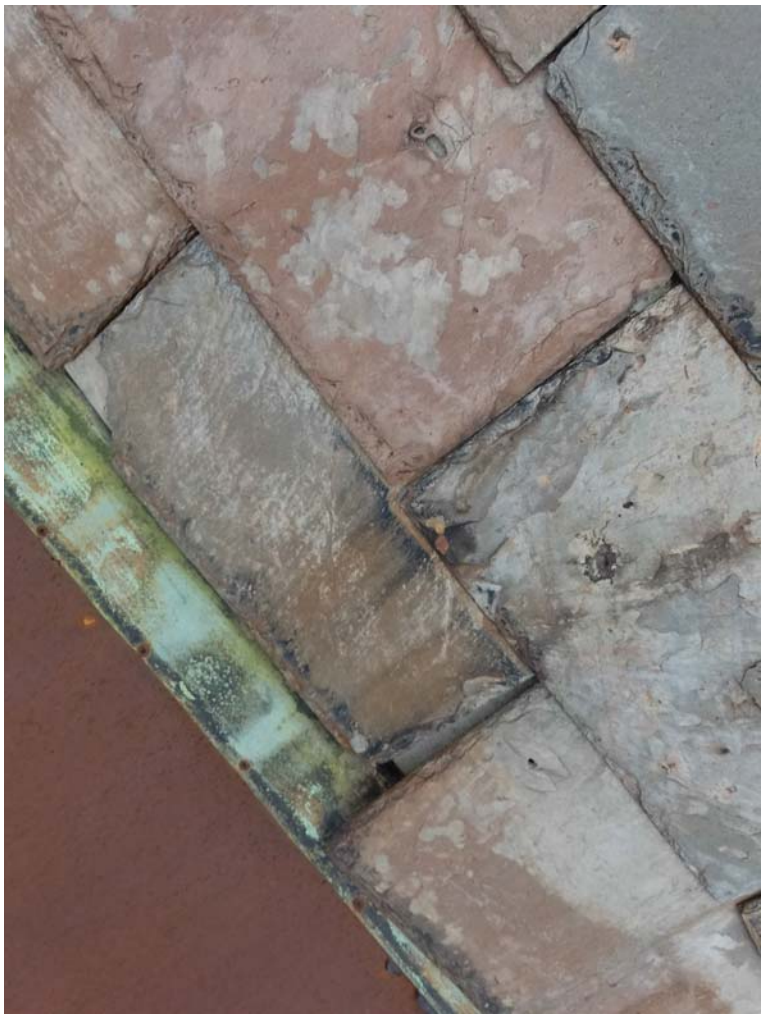


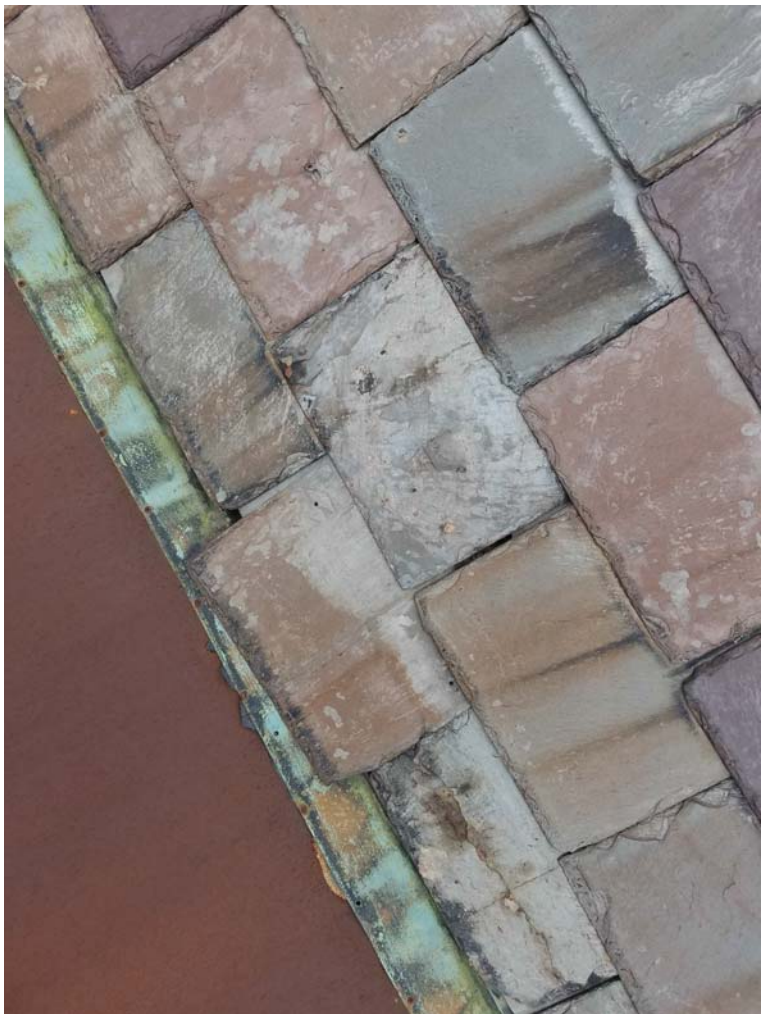


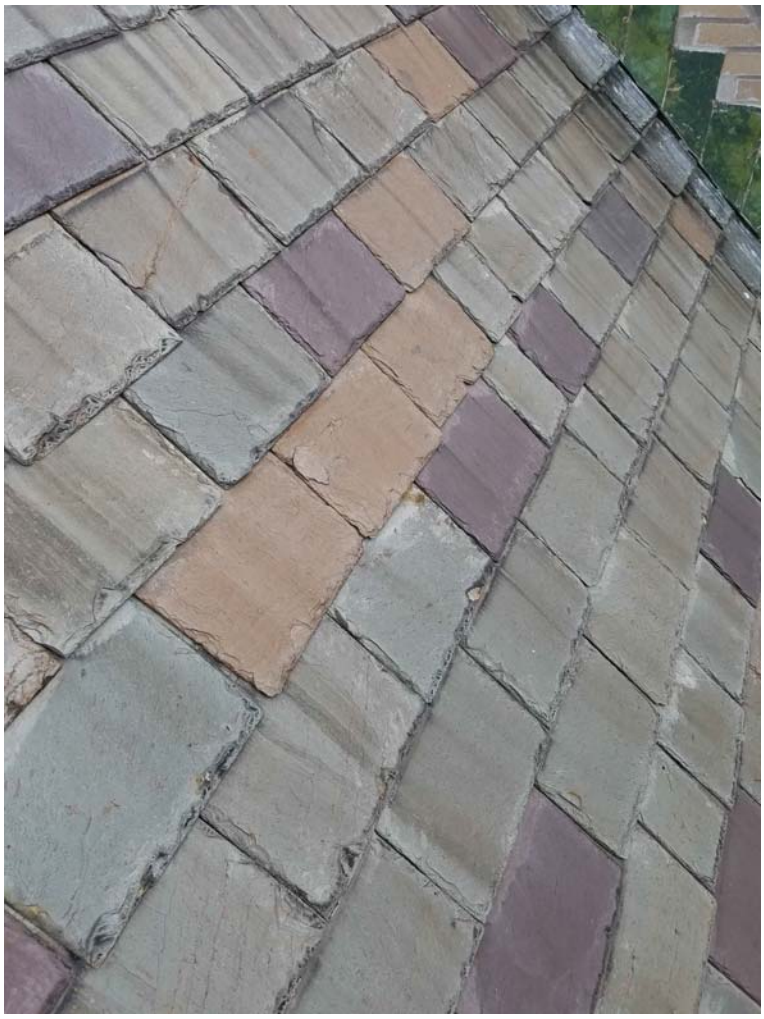


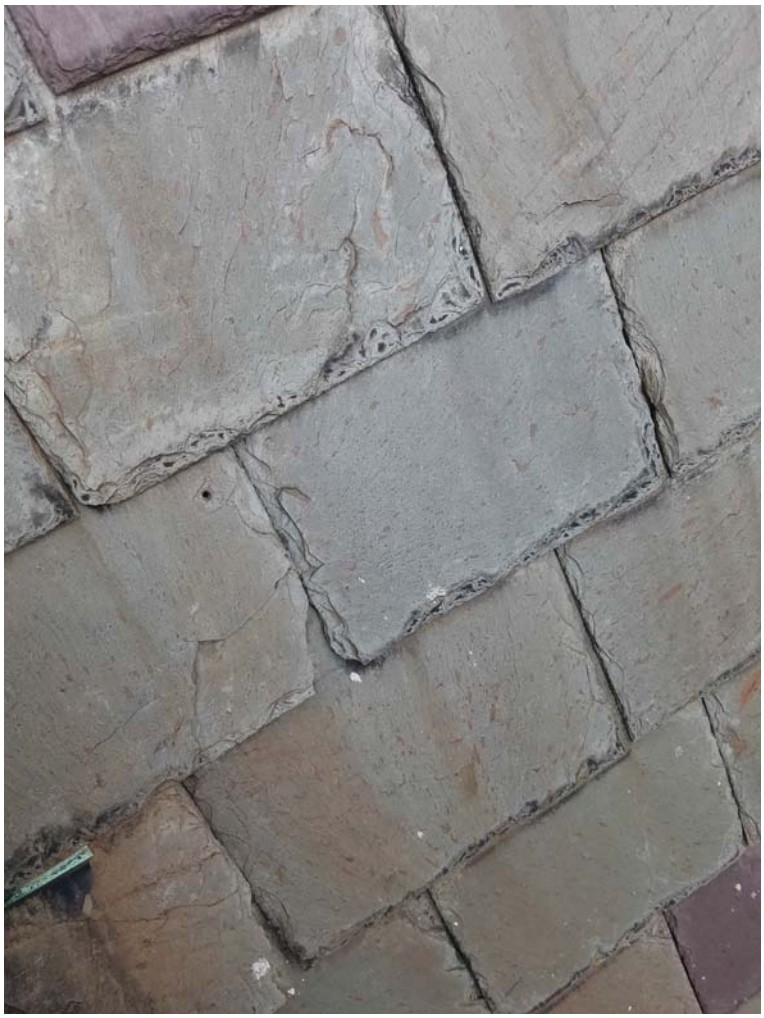


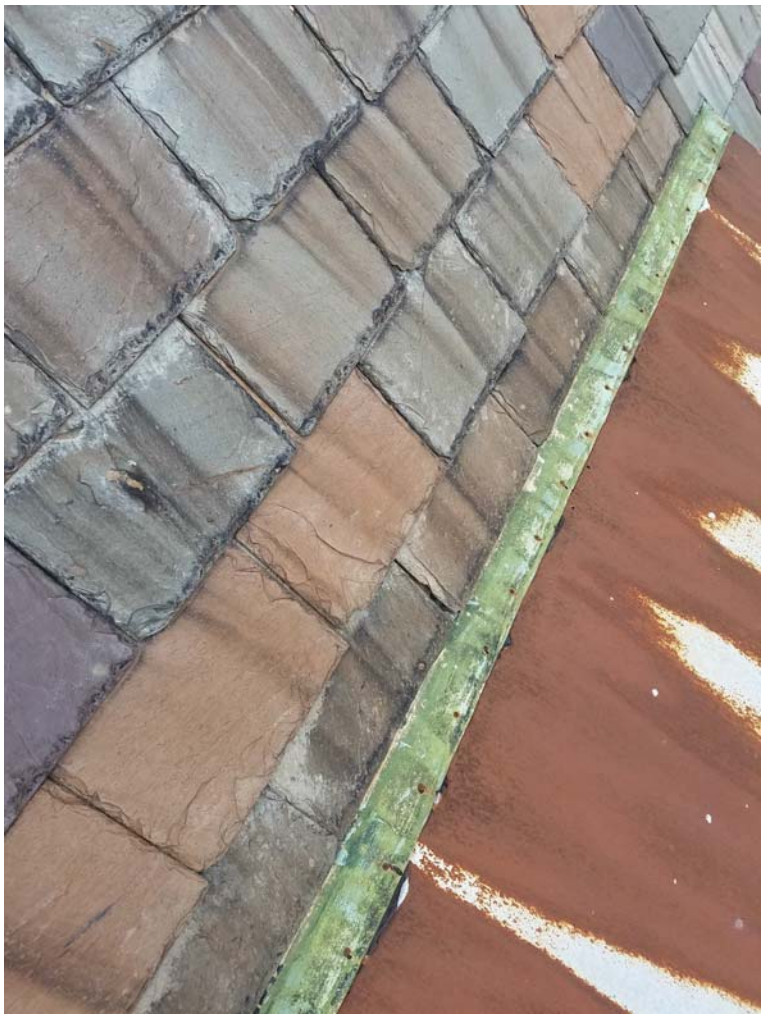


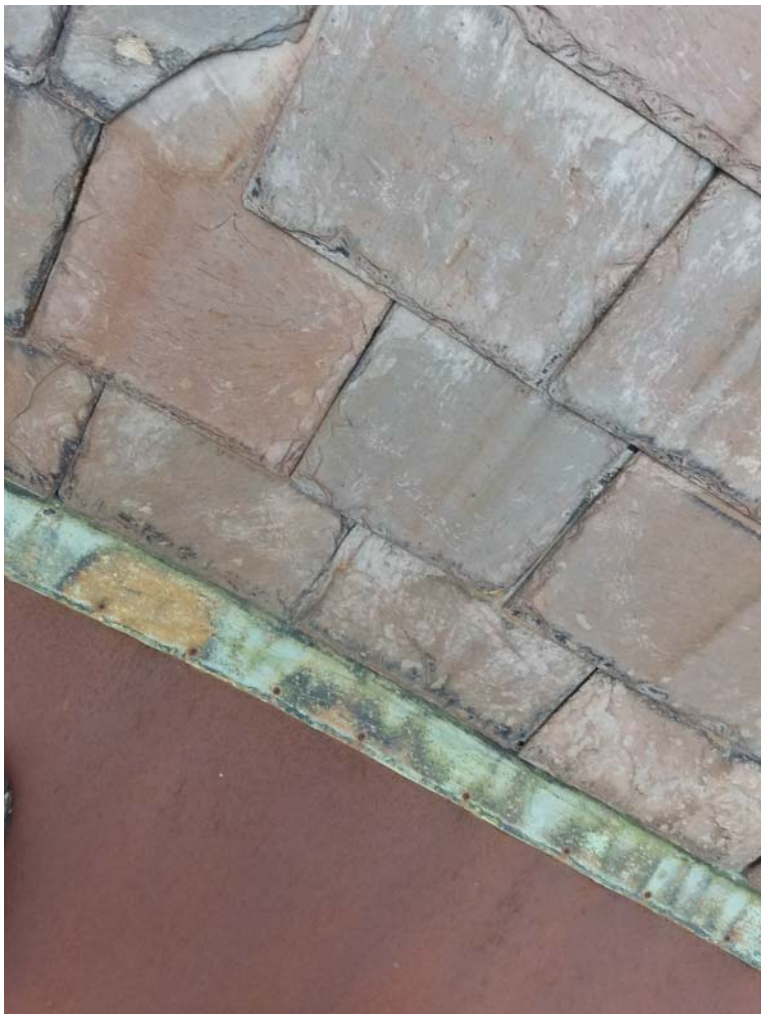


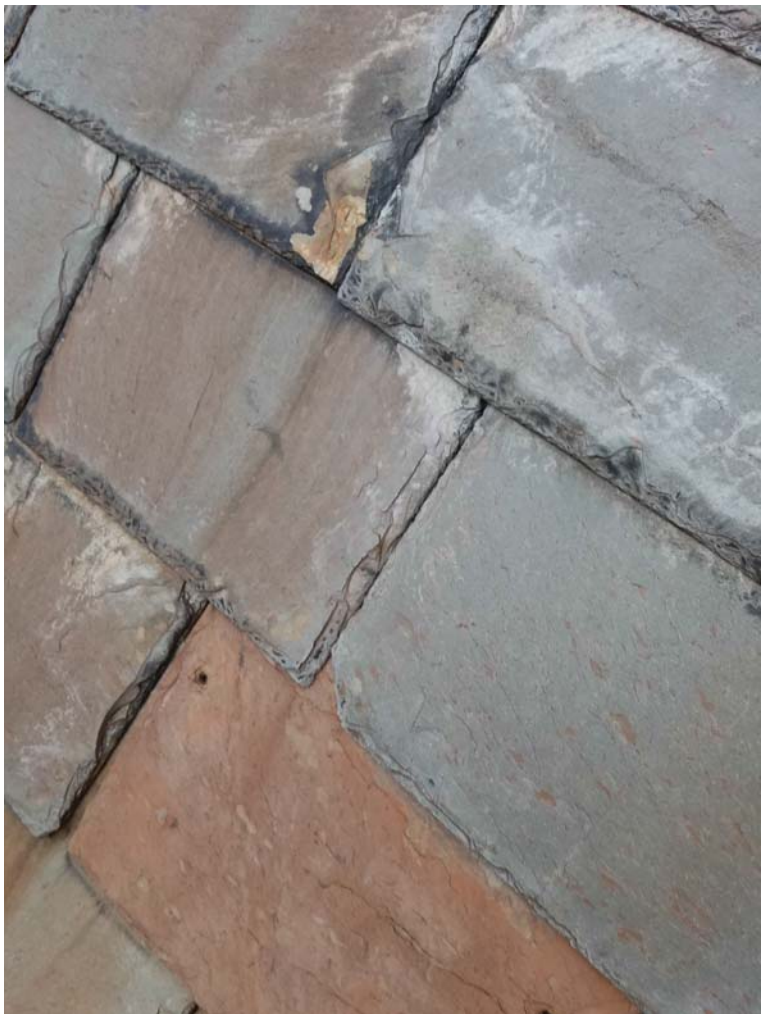


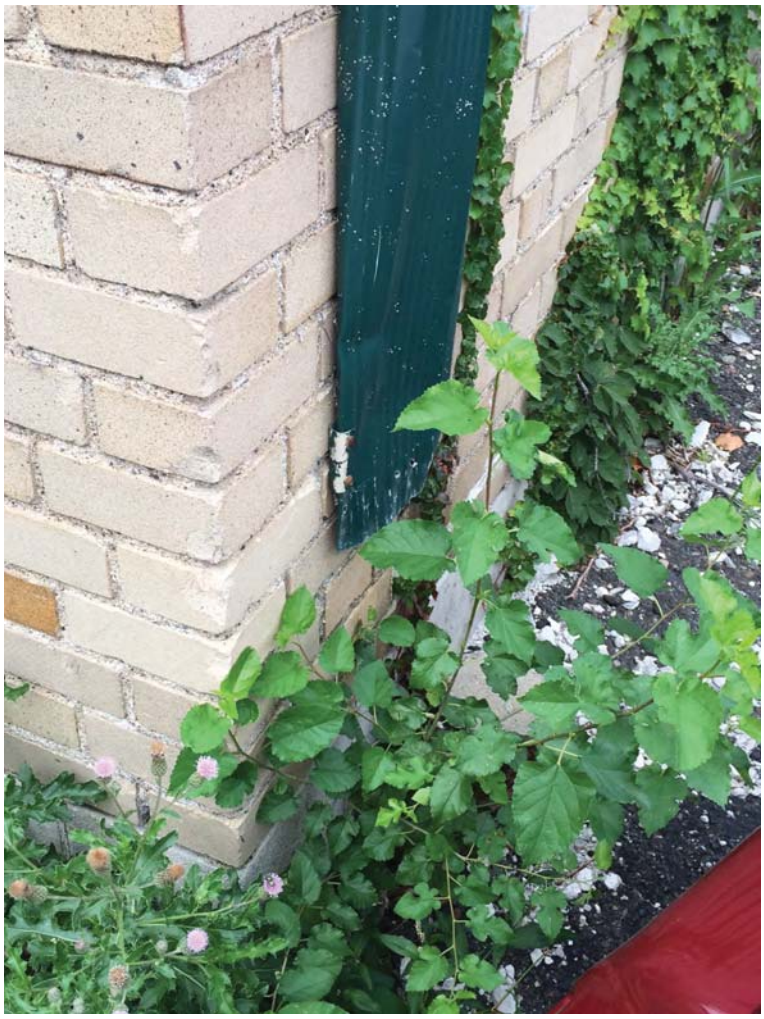













ΑΔΦ